English-Language Translation Of

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Attorney Docket No.

20077/US04033P

Horizontal Roller Mill

Technical Field

This invention relates to a material ground equipment, particularly to a horizontal roller mill.

Background Art

The patent 972477373.3 published on August 25, 1999 disclosed a "cylinder roller mill", which has a cylinder, and a support system supporting the outer wall surface at the lower portion of the cylinder, and a roller. Said roller is provided with an inlet means on an end cover at one end of the cylinder, and an outlet port on an outlet hood (end cover) at the other end of the cylinder, said roller being located within the cylinder, the roller surface of the roller and the lower surface at the inner cavity of the cylinder forming a material ground surface. The axle sections of both ends of the roller extend out of the end covers and outlet hoods of the end portions of the roller, the extended two axle sections each being provided with a pressurized mechanism (oil cylinder) for adjusting material ground pressure, said cylinder being provided on its outer wall surface with a driving member (gear) for rotating the cylinder. In addition, a baffle plate is disposed at the upper left of the rotating direction of the cylinder.

The cylinder roller mill has some advantage compared with the background art as described in its Description. However, the mill has a relatively low production yield as it has only one roller. When high revolution is needed to increase production yield, since the support system only supports the outer wall surface at the lower portion of the cylinder, the support system acts only to restrict the cylinder for the direction vertically downward, as for other directions along the circumference, especially the direction upward, the system stays at a free state. Thus, during operation, when inter-mediate or high speed is used, the cylinder body will produce radial runout or vibration, resulting in a poor stability and undesirable noise during operation. In addition, when the pressure mechanism drives the roller toward the material for

grinding, the force produced due to pressure and acted upon the cylinder is completely downward, causing various parts of the equipment to withstand an uneven force. Furthermore, the force due to pressure, transmitted via the cylinder, will completely act on the support system, and thus will affect the normal operation of the support system, and excess pressure will aggravate the wear of the member and even cause partial members to be damaged.

The object of this invention is to provide a horizontal roller mill, which can increase production yield, has a high reliability and stability, and a low noise of vibration during operation.

Contents of the Invention

The technical solution of this invention is that the roller mill includes a cylinder and rollers, both ends of said cylinder each is provided with a end cover, on the end cover of one end being provided an inlet means, and on the end cover of the other end (as referred to as outlet hood in the Background Art) being provided an outlet port. Said cylinder is provided on its outer wall surface with a driving member for driving the cylinder to rotate. The roller is located within the cylinder, the axial sections at both ends of the roller extending out of the end covers of the cylinder. The extended two axial sections each is provided a pressure mechanism for adjusting the material ground pressure and the gap between the roller surface and the inner wall surface of the cylinder. Said mill has at least two rollers, which are distributed along the circumferential direction of the inner cavity of the cylinder. The surface of each roller corresponding to the inner cavity of the cylinder forms a material ground surface. The mill is also provided with a support system for restricting the cylinder at the circumferential direction, and scrapers with respect to the material layer.

A further solution is that said at least two rollers are distributed uniformly along the circumferential direction of the inner cavity of the cylinder.

This invention has a support system for restricting the cylinder at circumferential direction, and at least two rollers, distributed or uniformly distributed along the circumferential direction of the inner cavity of the cylinder, thus having the following technical effects:

1. Two or more rollers operate simultaneously to increase production yield;

2. A support system acts to restrict the cylinder at circumferential direction, so that even in inter-mediate or high speed operation, it can effectively prevent the cylinder from radial runout or vibration during operation, thus ensuring a good stability during operation, and reducing notably the noise and damage due to vibration;

3. Since two or more rollers are distributed or distributed uniformly along the circumferential direction of the inner cavity of the cylinder, when the roller operates under normal pressure or increased pressure, the equipment is uniformly and equitably pressurized at various parts due to the rigidity construction of the cylinder itself when various forces act upon it, and no adverse effect is produced to the normal operation of other members connected to the cylinder. What is more, the pressure of the roller basically does not act upon the support system, thus reducing the friction between the roller and the support system, and reducing power consumption, ensuring a better stability and reliability;

4. Since at least two rollers are disposed, and the support system acts to restrict the cylinder at the circumferential direction, production yield can be effectively increased by adding revolutions. While increasing production yield, the pressure of the roller can be appropriately reduced to minimize the wear and damage of the members, consequently ensuring a longer life of the members and improving the reliability of operation, and furthermore, high speed operation facilitates processing of super-fine powders.

Description of Figures

Figure 1 is the front view of one structure of this invention;

Figure 2 is a cross-sectional view of Figure 1 along line A to A;

Figure 3 is a cross-sectional view of another structure of this invention;

Figure 4 is the front view of the variant structure of this invention, with the cylinder being a conical cylinder;

Figure 5 is the front view of another variant structure of this invention.

Mode of Carrying out the Invention

Figures 1 and 2 show a structure for implementing the invention, comprising a cylinder 1, rollers 2, with the two rollers being located within the cylinder, and arranged symmetrically up and down. Said cylinder is provided at both ends with end covers 3, 4, the end cover 3 being provided with an inlet means 5, and the end cover 4 being provided with an outlet port 6. The surface of each roller and the corresponding wall surface of the inner cavity of the cylinder form a material ground surface. The axial sections at both ends of each roller extend out of the end covers at both ends of the cylinder. The extended axial sections are each provided with a pressure mechanism 7 for adjusting the material ground pressure and the gap between the roller surface and the inner wall surface of the cylinder (i.e., the size of the gap of the material ground surface) by means of a rolling bearing. Between neighboring rollers is provided a scraper 8 which plays a part of loosing and axially transporting the material layers, the scraper being connected to the end cover via a hinged connecting rod, and the gap between the scraper and the inner cavity wall surface of the cylinder being adjustable. On the outer wall surface of the cylinder is provided with a driving member 9 for rotating the cylinder, the driving member 9 may be a gear member or a driving member of other type. The driving input will bring the cylinder into rotation, and the roller 2 will rotate accordingly so as to grind the material. A support system 10 is provided for restricting the cylinder at circumferential direction, as shown in Figure 2, two independent support systems are arranged symmetrically up and down along the circumferential direction on the outer wall of the cylinder. Said support system may be of sliding bearing-type structure, and also may be of riding wheel or other support structure, which plays a part of radial restriction to the cylinder along the circumferential direction, thus effectively preventing the cylinder from radial runout or vibration during operation, and resulting in a good stability, reduced vibration and low noise. Such a system can meet the requirement of inter-mediate and high-speed operation to increase production yield. Said end cover, pressurized mechanism and support system may be fixed on the frame, and may also be connected directly to a specially set prefab. In addition, a guiding means 11 may be disposed under the scraper 8 at the upper portion of the inner cavity of the cylinder, the tilt

angle of the guiding means being adjustable to control the speed of the material flow, and the guiding means being connected to the end cover via a hinged connecting rod. The axial limitation of the roller is the same as the prior art.

Figure 3 shows a cross-sectional view of another embodiment of this invention. In this structure, three rollers 2 are distributed uniformly along the circumferential direction in the inner cavity of cylinder 1, the support system 10 is arranged along the outer wall surface of the cylinder 1 for restriction. The remaining is the same as the above embodiment.

Figure 4 is the main view of one variant structure of this invention. The cylinder 1 is modified to a conical cylinder, the roller 2 is modified to a conical roller, the surface of the conical roller corresponding to the inner wall surface of the cylinder. The material is put in from the inlet means 5 of a smaller port of the conical cylinder, and flows toward the outlet port 6 of a larger port during grinding. The inner wall of the conical cylinder can produce an axial component of force enabling the material to slide forward so as to reduce the wear of, and force upon, the scraper.

Figure 5 is the main view of another variant structure of this invention. The structure that the axial sections at both ends of the roller 2 is provided with a pressurized mechanism 7 is modified to a structure that the axial section of either one end of the roller is provided with a pressure mechanism 7, and the axial section of the other end thereof is connected to a hinged seat 12 via a rolling bearing. The roller 2 can achieve a pressurized grinding to the material by the action of the pressurized mechanism on one end of the roller 2.

Any variant structure of the technical solution of this invention falls within the protection scope of this invention.

Claims

1. A horizontal roller mill comprising a cylinder and rollers, both ends of said cylinder each being provided with an end cover, the end cover of one end being provided with an inlet means, the end cover of the other end being provided with an outlet port, on the outer wall surface of said cylinder is disposed a driving member for rotating the cylinder, the roller being located within the cylinder, the axial sections at both ends of the roller extending out of the end covers of the cylinder, on the two extended axial sections being provided with a pressurized mechanism for adjusting the material ground pressure and for adjusting the gap between the surface of the roller and the inner wall surface of the cylinder, and there being provided scrapers with respect to the material layers, characterized in that there are provided at least two rollers, which are distributed along the circumferential direction in the inner cavity of the cylinder, and there is provided a support system for restricting the cylinder at the circumferential direction.

2. A horizontal roller mill according to claim 1, characterized in that said at least two rollers are distributed uniformly along the circumferential direction in the inner cavity of the cylinder.

3. A horizontal roller mill according to claim 1 or 2, characterized in that said cylinder is a conical cylinder, said roller is a conical roller, and the surface of the conical roller corresponds to the inner wall surface of the cylinder.

4. A horizontal roller mill according to claim 1, or 2 or 3, characterized in that scrapers are provided between all neighboring rollers.

5. A horizontal roller mill according to claim 1, or 2 or 3, characterized in that a guiding means (11) is arranged under the scraper (8) at the upper portion of the inner cavity of the cylinder, and the tilt angle of the guiding means is adjustable.

6. A horizontal roller mill according to claim 1, or 2 or 3, characterized in that on the axial section of one of the two ends of said roller is provided a pressurized mechanism (7) for adjusting the material ground pressure and adjusting the gap between the surface of the roller and the inner wall surface of the cylinder, the axial section of the other end is connected to a hinged seat (12).

Abstract

A horizontal roller mill comprises a cylinder 1 and rollers 2, both ends of the cylinder being provided with an end cover 3, 4, on the end cover 3 being provided with an inlet means 5, and on the end cover 4 being provided with an outlet port 6. On the outer wall surface of said cylinder is provided a driving member 9, which brings the cylinder into rotation. The roller is located within the cylinder. Axial sections at both ends of the roller extend out of the end covers at both ends of the cylinder, the two extended axial sections are provided with a pressurized mechanism 7 for adjusting the material ground pressure and adjusting the gap between the surface of the roller and the inner wall surface of the cylinder. Scrapers are disposed with respect to the material layers. There are provided at least two rollers, distributed or distributed uniformly along the circumferential direction in the inner cavity of the cylinder, the surface of each roller and the wall surface corresponding to the inner cavity of the cylinder form a material ground surface. A support system 10 is provided for restricting the cylinder at circumferential direction.

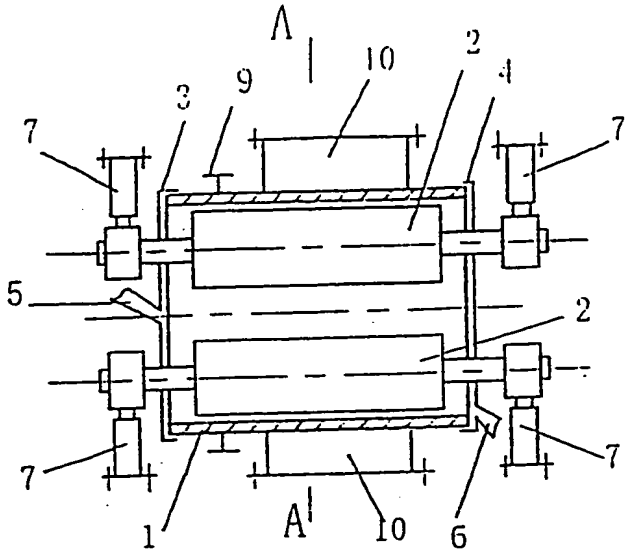

FIG 1

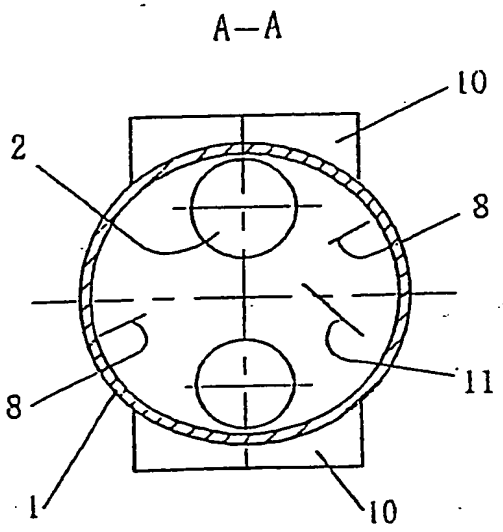

FIG 2

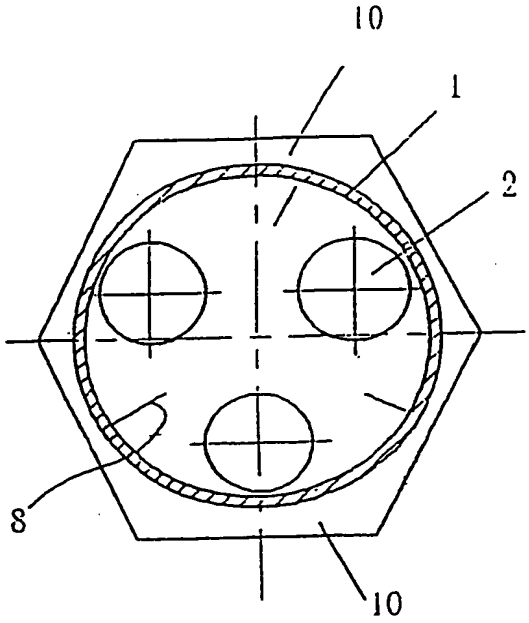

FIG 3

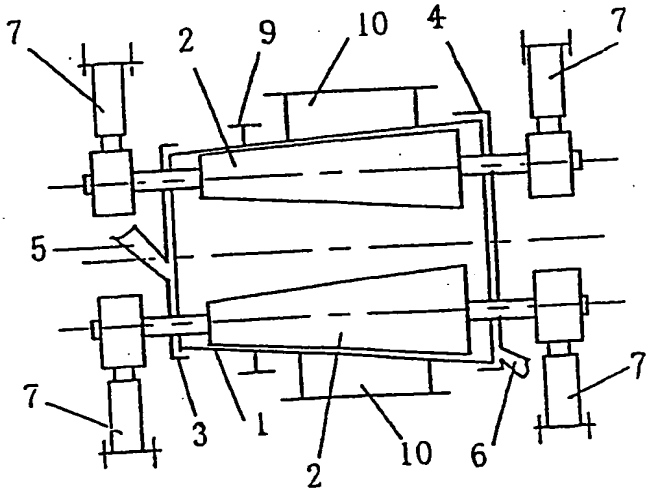

FIG 4

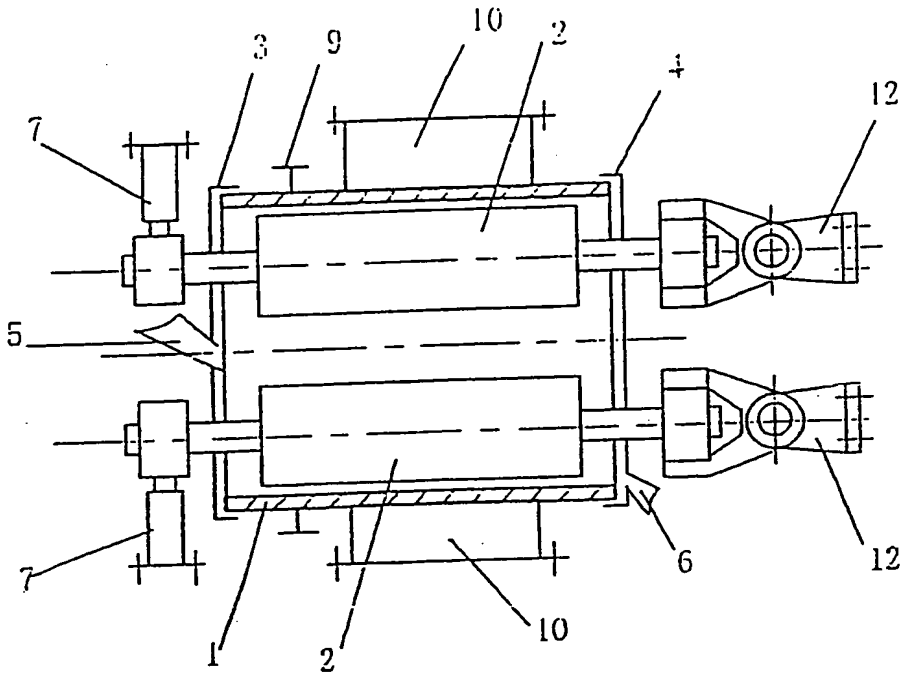

FIG 5